

Some Myths of Procurement

With extracts from an unpublished book entitled “How much will it cost, how long will it take and what use will it be” by Philip G Pugh

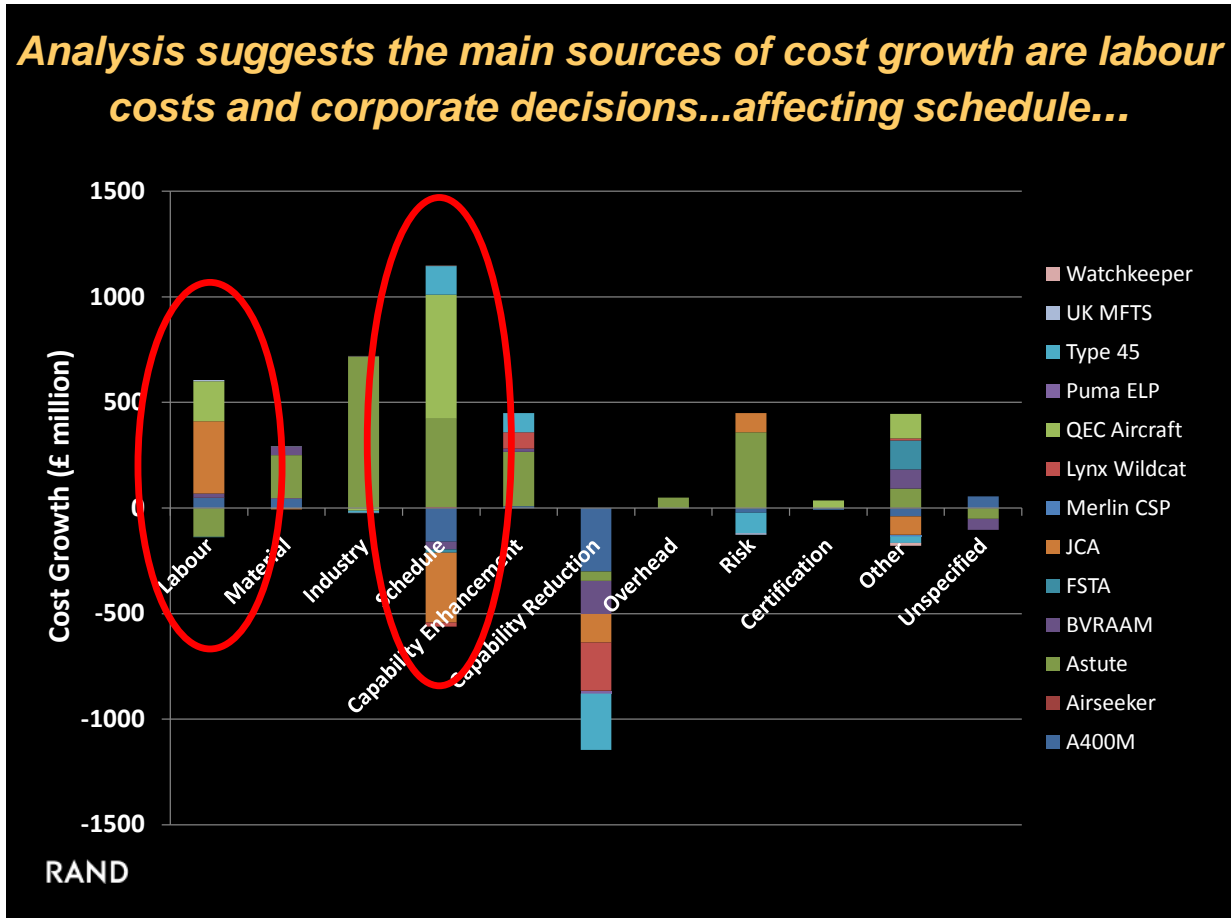
SCAF Workshop
27th November 2012

To Re-cap – Forecasting for Success

- **Tim Sheldon** spoke about Independent Cost Estimating, the CAAS mission, their blueprint for 2015 and the challenges being faced in rebuilding the group. The presentation focussed on probabilistic analysis to re-profile costs, identify contingency and compare with the Project Finance and Budget Setting. He highlighted the lack of experience and high reliance on propriety estimating models – not an ideal situation for confidence.
- **Andrew Tyler** spoke with the experience of a Chief Executive and highlighted the need to understand uncertainty and risk and mentioned more than once the adverse effects from unknown-unknowns and the need for greater governance on programmes that took several years to mature.
- **Mick Porter** stated that forecasting starts with certain assumptions based on the management's experience, knowledge, and judgment. These estimates are projected into the coming months or years using one or more techniques.

To-Recap – Cause for Concern

- Matt Bassford (RAND)** spoke about the key areas of cost growth and identified Labour cost and Corporate Decisions as being the main drivers. He also said that Cost and Risk analysis requires judgements based on incomplete and uncertain information.



To Re-cap – What was not said !!

All of the presentations gave a good overview of the general activities we would expect to see from cost forecasters. However, in describing the various roles and functions there were some glaring omissions and glossing over some of the more troublesome soft issues that the costing community have to deal with.

This presentation aims to discuss the two key areas:

- 1. Cost Modelling** – The desire to make things more complex than necessary.
- 2. Optimistic Forecasting** – Favourable forecasts are always welcomed while unfavourable ones are challenged strenuously.

Cost Modelling – Simple is Best

Throughout the 1980s much effort was expended in conducting detailed studies on forecasting the cost of Typhoon. Eventually after thousands of person-hours and much argument a figure of **£10m at 1981 prices** was reached.

It was pointed out that this cost was less than that for a Tornado F3 (the aircraft being replaced) which were costing about **£12m to manufacture**. For the previous 40 years the ratio of UPC to Empty Weight of each new aircraft had been at least twice that of the aircraft it replaced. Therefore, even with Typhoon intended to be 70% of the size of Tornado F3 the least allowed as its UPC should be **$2 \times 0.7 \times £12m \approx £17m$ at 1981 prices**.

This was held to be far too simple an argument for the decision-makers. As the new century arrived and Typhoon came off the production line each was costing **£19m at 1981 prices**.

The real difficulty in obtaining an accurate forecast of cost is very often one of keeping things simple and refusing to be seduced, or forced into complexity.

Optimistic Forecasting – Myths

Of one thing the cost forecaster can be assured. This is that as soon as their forecast is produced there will not want for persons asserting that it is far too great a cost and far too long a time to complete the project in question.

Most such assertions rely on myths that persist tenaciously despite being disproved repeatedly by experience.

Pressures on those forecasting costs can be great and are ever-present. They exist even where organisations maintain so-called ‘independent’ cost forecasting units – and seek sincerely to accord them such status.

Top 10 myths worth discussing

Breaking the Mould

Assertion

It is often asserted that advances in technology and/or management have taken place since the last project . These advances will be exploited to the full. Therefore, ‘this time, we are breaking the mould’ Hence, to complete the project it will be cheaper than history would suggest.

Reality

The reality is that it is hoped that the mould is being broken (again). Every generation makes advances in technology and/or management and so, ‘breaks the mould’.

The growth of productivity over time is factored into the forecast already through the choice of deflator when analysing past projects. The mould has to be broken again to be consistent with history and hence with the forecast being made. If it not then the costs will be even higher.

CAIV and DTC

Assertion

The thought occurs to those commissioning projects that cost is a function of the performance required from the product that they procure. They decide then to permit performance to be traded off against cost even at late stages of the project. Hence, it is asserted that this time the costs will be much lower than forecast – or rather, they will be similar to those of the last comparable project because if that is not the case then performance will be traded off for cost.

Reality

The reality is that when such trade offs are complete it will be found that the same cost buys only much the same performance as before. Then, where will be the justification for the expense of developing a new design?

There is a thought that CAIV and DTC should have been discredited by experience in USA trials some time ago. Those programmes that were subject to CAIV/DTC management experienced far greater overruns than those which were not subject to the process.

Assertion

All too often it is assumed that a project will not be as expensive as a forecast based on the outcomes of past projects – a detailed risk analysis has been conducted and that has found very few risks.

Reality

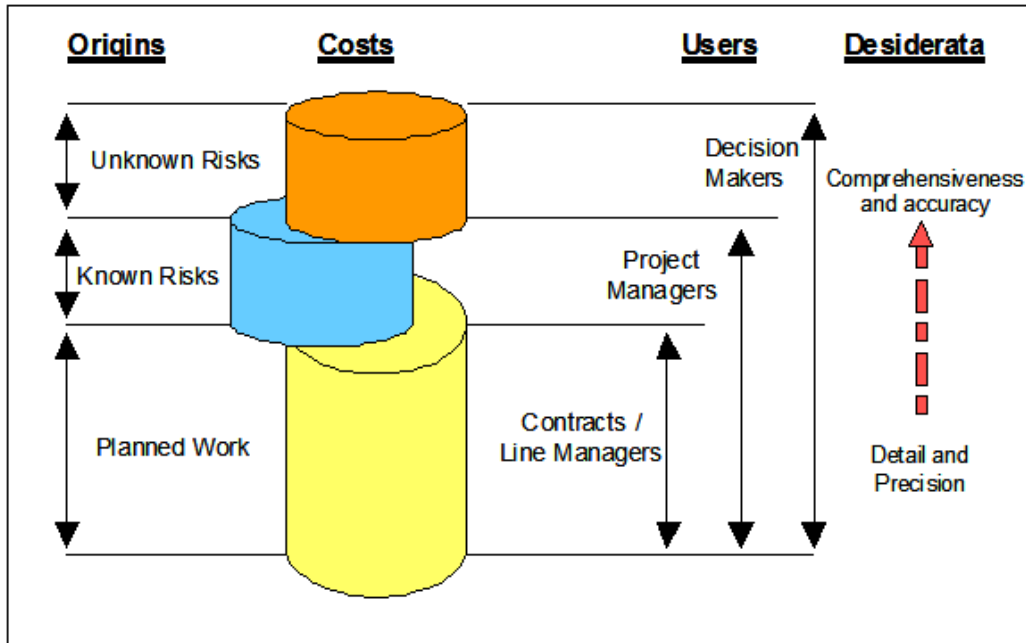
Equally as often, if a risk analysis has found few risks it is because those conducting it were not looking very hard. A search for risks becomes a search for justification of design and management decisions already made. The chosen design will be free of risk of malfunction or miscarriage.

For this reason, the majority of risks eventuating during development are not identified beforehand even with the most comprehensive risk analysis.

To Each Their Own Estimate

Top level decision making does not concern details of how money is spent.

Options and choices are made based on the total costs in relation to benefits. However, estimates of such total costs must be comprehensive – including allowances not only for known risks but also for risks that are unknown in the sense that they have yet to be identified.



Not only is it unnecessary to base decision-making on highly detailed estimates – it is a mistake to do so.

By their nature ‘unknown’ risks cannot be specified in detail. Hence, if detail is demanded then it is inevitable that such risks are neglected. Thereby the total cost is underestimated to an important degree.

Assertion

It may be argued that technology has moved on since the last comparable project was completed. That is true, almost certainly. However, it is a move onto much less sure ground to then assert that since more is known now mistakes will no longer be made and hence, a new project will be cheaper than history would indicate.

Reality

It will be found usually that technology has advanced but so has what is being asked of it. Therefore, knowledge and requirements stand much as they ever did in relation to each other. The mistakes of the past may not be repeated, but there will be new mistakes to be made.

After all, there is an infinite number of ways of getting a design wrong. Knowing how to avoid one or two of these does not shorten the odds much.

Mature Technology

Assertion

In a variant of the technology argument, it may be asserted that a product will be very cheap to develop because it uses only mature technology. These assertions are most common when a decision on approval is imminent.

Descriptions of defence projects by their advocates undergo a curious transformation from projects being 'at the cutting edge of technology' to them being 'of entirely mature technology' only for them revert to the former status once approval has been given.

Reality

Whatever the true technological status may be it is largely irrelevant. The cost of development is incurred in improving reliability and in demonstrating compliance with a specification, both essential however mature the technology is.

Assertion

When much is at stake, the advocates of a project may assemble a large team of supposed experts. Usually, these will agree that the project is everywhere much more straightforward and much less costly than initial forecasts suggest.

In fact the 'group think' only facilitates belief in the impossible.

Reality

Truth is not a matter of voting. It is the quality of the argument that matters, not the number of advocates. Remember that the initial estimate is the only one to have been prepared before it was known that the cost could be inconveniently large and, hence, the only one to have been prepared free of temptation and pressure towards understatement of cost and risk.

It's all in the past

Assertion

In a generalisation of much of the assertions reviewed so far, forecasts based on the analysis of past project are dismissed as being 'all in the past' and, so supposedly irrelevant to the future. However, it is in the very nature of existence that the only information which we have –and, hence, the only basis for forecasting- comes from the past. The past is all that we know.

Reality

To reject the use of past data is to reject all that we know –and can ever know. It leaves irrational prejudice as the only basis for what then follows.

Put another way, there is not a choice between methods based upon past projects and some other methodology. The latter does not, and can not, exist. Of necessity, all rational forecasting is based upon, and is an extrapolation from, the past. The sole point ever at issue can be only how well the past is interpreted and analysed. In that regard, extensive historical research has much to commend it.

The Company is at Stake!!

Assertion

When times are hard or when an especially challenging project is being undertaken then a curious perversion of logic emerges all too frequently. In this, should the possibility of meeting particular deadlines or the likelihood of completing a project at some low cost be queried then it is asserted that the organisation responsible is sure to deliver on its promises because it must – because its future depends upon it doing so.

Reality

This is to conflate two entirely distinct realities. One is what the organisation has promised to do. The other is what can be done for the cost and in the time promised. Those two separate facts, together determine the outcome. One does not alter the other. If what the organisation has promised is feasible at the cost and in the time promised then it will deliver and survive. If the organisation has promised more than is possible then it will fail and cease to be.

Strong Management

Assertion

When reassurance of investors or customers becomes necessary then it is common to assert that the project will be 'driven through' to a successful conclusion by its 'strong management team', headed usually by some well-known (and very highly paid) figure. Good management is important however, there is always a minimum time and cost for a job to be completed satisfactory. Moreover, given a competitive market, those minima differ little from what similar jobs have cost in the past.

Reality

Strong management can be manifest by insisting upon those doing the work having adequate time and resources to complete their tasks plus the allocation of adequate contingencies against risk. Alas, all too often management manifests its 'strength' by imposing the impossible upon those below and expresses its self-confidence in inadequate contingencies.

In the management of large projects, as elsewhere, humility is a virtue. The more assertively management expresses confidence, the more the prudent forecaster should look to the provision of contingencies.

Two other points to consider

A voice of experience

*There are three roads to ruin – women, gambling and technicians.
The most pleasant is with women, the quickest is with gambling,
but the surest is with technicians.*

Georges Pompidou (1911-1974)
President of France during an era of many ‘grandes projets’

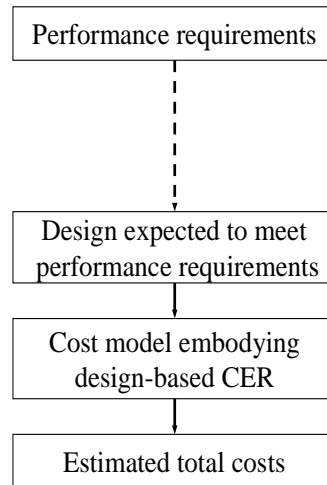
- Use indices of output costs (GDP) when deflating the costs of past projects to constant economic conditions (covers advances in technology and efficiency).
- Be alert to situations of extreme project pride and unjustifiable claims.
- No designer will offer a design unless they believe it will do the job – however, failures here are far from uncommon.
- Keep in mind the difference between proving that a goal is feasible and its achievement.

Naturally, all technical experts are inclined to assert that the present, i.e. when they are making their own contribution, is an era of exceptional progress.

The issue for the forecaster is whether such progress is sufficient to obviate the risk of failing to achieve the performance required of the new product under consideration or whether that achievement may call for a different, and more expensive, design than that which is being proposed.

The Achilles heel of concept costing

Even 'top-down' methods of forecasting are prone to underestimate costs if premature use is made of design details. Designs change during the development phase of a project, almost invariably towards greater size and complexity of what is eventually to be manufactured.



1. Identification of a design presumed to yield the required performance. If made ahead of design and development work (e.g. at the concept stage) this is necessarily an uncertain presumption open to gross error.
2. Resulting costings may be accurate estimates of the costs of the postulated design yet be underestimates of outturn costs as greater size and/or complexity than postulated proves necessary to meet performance requirements.

Understanding the Basics



Summary

Capabilities and Costs are the two sides of the defence equipment coin; neither is meaningful apart from the other.

Every procurement choice is a compromise between the two. Without knowledge of defence equipment costs neither can choices correctly be made nor can the significance of those choices be properly understood.

Optimism Bias is a “quick fix” and may superficially attractive but it is bad policy when applied to projects individually. Simply adding a percentage to all forecasts penalises the few who do produce accurate estimates relative to the many who understate the costs.

It should be the mantra of every cost analyst to be acquainted with context and history, remain independent of pressures and keep the ‘big picture’ always in view.

Acknowledgement

Phillip Pugh passed away in 2009. He was a friend, colleague and mentor to several of us within industry, government and academia. His publications supplemented many of the technical books found in the business section of any good bookshop and sought to plug the gap between methods and data application – to enable the reader to answer essential questions on cost forecasting.

This presentation included many of his thoughts from his unpublished book:

How Much Will it Cost, How Long Will it Take and of What Use Will it Be?

: A practical guide to forecasting the costs and benefits of new projects

My sincere thanks

Arthur Griffiths

Questions ?

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